CLAIMS

What is claimed is:

1. A method of biomarker discovery, said method comprising the steps of:

providing a complex analyte as a candidate biomarker source;

providing a control sample for said complex analyte;

using an aliquot of said complex analyte as an immunogen to generate a population of monoclonal antibodies directed against antigens in said complex analyte;

screening said population of monoclonal antibodies directed against antigens in said complex analyte against another aliquot of said complex analyte;

screening said population of monoclonal antibodies directed against antigens in said complex analyte against an aliquot of said control sample; and

selecting at least one monoclonal antibody that exhibits a significant difference in binding to an antigen in said complex analyte compared to an antigen in said control sample, whereby the antigen(s) selectively bound by said at least one selected monoclonal antibody are said biomarker(s).

2. The method of claim 1, wherein, in said selecting step, said one or more monoclonal antibodies exhibits an increase in binding to an antigen in said complex analyte compared to an antigen in said control sample.

3. The method of claim 1, wherein, in said selecting step, said one or more monoclonal antibodies exhibits a decrease in binding to an antigen in said complex analyte compared to an antigen in said control sample.

4. The method of claim 1, wherein said complex analyte is diluted before use as an immunogen.

5. The method of claim 1, wherein said complex analyte is fractionated before use as an immunogen.

6. The method of claim 1, wherein said complex analyte is a clinical sample.

7. The method of claim 6, wherein said complex analyte is a human bodily fluid.

8. The method of claim 7, wherein said complex analyte is human blood.

9. The method of claim 8, wherein said complex analyte is human plasma.

10. The method of claim 8, wherein said complex analyte is human serum.

11. The method of claim 7, wherein said complex analyte is human urine.

12. The method of claim 7, wherein said complex analyte is human cerebrospinal fluid.

13. The method of claim 6, wherein said complex analyte comprises proteins or peptides.

14. The method of claim 13, wherein said complex analyte comprises glycoconjugated proteins or peptides.

15. The method of claim 13, wherein said complex analyte comprises a group of disease specific proteins.

16. The method of claim 13, wherein said complex analyte is depleted of abundant proteins before use as an immunogen.

17. The method of claim 1, wherein said complex analyte is enriched in a class of analyte elements that share physicochemical properties before immunization.

18. The method of claim 6, wherein said complex analyte is from an individual patient, wherein said control sample is from one or more healthy individuals and whereby said selecting step identifies a biomarker that distinguishes said patient from said healthy individuals.

19. The method of claim 6, wherein said complex analyte is from an asymptomatic individual having increased risk for the disease of interest, wherein said control sample is from one or more healthy individuals and whereby said selecting step identifies a biomarker that distinguishes said asymptomatic individual from said healthy individuals.

20. The method of claim 6, wherein said complex analyte is from an individual patient who has responded to a treatment, wherein said control sample is from an individual patient who has not responded to said treatment and whereby said selecting step identifies a biomarker that distinguishes an individual patient who will respond to said treatment from an individual patient who will not respond to said treatment.

21. The method of claim 1, further comprising the step of determining the identity of said biomarker(s).

22. The method of claim 1, further comprising the steps of determining the identity of a plurality of said biomarkers and deploying a systems biology strategy for prioritization of said plurality of biomarkers for future development.

23. A method of biomarker discovery, said method comprising the steps of:

providing a complex analyte as a candidate biomarker source;

providing a control sample for said complex analyte;

using an aliquot of said complex analyte as an immunogen to generate a population of monoclonal antibodies directed against antigens in said complex analyte;

screening said population of monoclonal antibodies directed against antigens in said complex analyte against another aliquot of said complex analyte;

screening said population of monoclonal antibodies directed against antigens in said complex analyte against an aliquot of said control sample;

selecting a plurality of monoclonal antibodies that each exhibits a significant difference in binding to an antigen in said complex analyte compared to an antigen in said control sample, whereby the antigens selectively bound by said plurality of selected monoclonal antibodies are a plurality of said biomarkers;

determining the identity of said plurality of biomarkers; and

deploying a systems biology strategy for prioritization of said plurality of biomarkers for future development.

24. A miniaturized diagnostic device comprising

a device body;

a sample injection port in one face of said device body;

an assay readout in one face of said device body; and

a microfabricated substrate within said device body, said substrate comprising an immunoaffinity trapping chamber, a detection chamber, a channel from said sample injection port to said immunoaffinity trapping chamber, a channel from said immunoaffinity trapping chamber to said detection chamber, said a channel from said immunoaffinity trapping chamber to said detection chamber comprising a waste discharge port, and a communication element for communicating information from said detection chamber to said assay readout.

25. A method of generating a monoclonal antibody library related to a specific disease or condition, said method comprising the steps of:

providing a complex analyte related to a specific disease or condition;

providing a control sample for said complex analyte;

using an aliquot of said complex analyte as an immunogen to generate a population of monoclonal antibodies directed against antigens in said complex analyte;

screening said population of monoclonal antibodies directed against antigens in said complex analyte against another aliquot of said complex analyte;

screening said population of monoclonal antibodies directed against antigens in said complex analyte against an aliquot of said control sample; and

selecting a plurality of monoclonal antibodies that each exhibits a significant difference in binding to an antigen in said complex analyte compared to an antigen in said control sample, whereby the antigens selectively bound by said plurality of selected monoclonal antibodies are said monoclonal antibody library related to said specific disease or condition.